DOCUMENT RESUME

ED 206 330 IR 009 850

TITLE	Evaluator's Guide for Microcomputer-Based Instructional Packages.
INSTITUTION	Northwest Regional Educational Lab., Portland, Oreg.
SPONS AGENCY	National Inst. of Education (ED), Washington, D.C.
PUB DATE	[81]
NOTE	61p.; Developed by MicroSIFT, A Project of Computer Technology Program.
EDRS PRICE	MF01/PC03 Plus Postage.
DESCRIPTORS	Computer Assisted Instruction; *Computer Programs; Elementary Secondary Education; Evaluation Criteria; *Evaluation Methods; Guidelines; *Microcomputers
IDENTIFIERS	*Microcomputer Software and Info for Teachers

ABSTRACT

This guide developed by MicroSIFT, a clearinghouse for microcomputer-based educational software and courseware, provides background information and forms to aid teachers and other educators in evaluating available microcomputer courseware. The evaluation process comprises four stages: (1) sifting, which screens out those programs that are not instructional in nature and determines a package's operational readiness and hardware compatibility; (2) package description, including program format, instructional purpose and technique, type of package, available documentation, and the hardware configuration necessary for operation; (3) courseware evaluation, i.e., an assessment of the content, instructional quality, and technical quality of the package; and (4) in-depth evaluation, which is not described in this guide. Forms for the second and third phases are provided, together with explanations of the kinds of information needed and discussions of some of the factors to be considered in completing certain sections of the forms. Definitions of 15 terms are provided in the introductory section. (CHC)

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EVALUATOR'S GUIDE

For Microcomputer-Based Instructional Packages

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Developed by

MicroSIFT

A Project of

COMPUTER TECHNOLOGY PROGRAM
Northwest Regional Educational Laboratory
300 S.W. Sixth Avenue
Portland, Oregon 97204

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This work was developed under a grant and contracts with the National Institute of Education, U.S. Department of Edlucation. However the content does not necessarily reflect the position or policy of that Agency, and no official endorsement of these materials should be inferred.

ACKNOWLEDGEMENTS

This guide and related evaluation instruments were developed by Northwest Regional Educational Laboratory's Computer Technology Program with the assistance of the Research on Evaluation Program of NWREL, and with funds from the National Institute of Education.

National Institute of Education
Dr. Richard Otte, Project Monitor

Division of Evaluation, Research and Assessment, NWREL
Dr. Nick Smith, Director, Research on Evaluation Program
Dr. Gabriel Della-Piana, Consultant
Tom Eucker, Intern
Penny McDonald, Intern

Computer Technology Program, NWREL
Dr. Judith Edwards, Director, Computer Technology Program
Donald Holznagel, Coordinator, MicroSIFT Project
Jerilyn Marler, Editor
Nancy Allen, Consultant
Dr. Robert Woolley, Consultant
Dr. Dan Isaacson, Consultant

Pilot tests of early versions were completed with the assistance of personnel from Beaverton School District, Beaverton, Oregon and Portland School District, Portland, Oregon.

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GUIDE

The field test of this booklet and the evaluation process was performed by staff members of the following institutions, and their constituent school districts:

Clackamas Educational Service District, West Linn, Oregon

Institutes for Educational Research (IER), Chicago, Illinois

Jefferson County Public Schools, Lakewood, Colorado

Minnesota Educational Computing Consortium (MECC), Lauderdale, Minnesota

Minnesota School District Data Processing Joint Board (TIES), Roseville, Minnesota

Region IV Educational Service Center, Houston, Texas

Region X Educational Service Center, Dallas, Texas

San Mateo Educational Resource Center (SMERC), San Mateo, California

Technical Education Research Centers (TERC), Cambridge, Massachusetts

The field test also included faculty and students of Utah State University, Logan, Utah, and esepecially the use of the Guide in the graduate course Instructional Technology 622, "Computer Applications in Education".

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EVALUATOR'S
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TABLE OF CONTENTS

		Page
I.	INTRODUCTION	1
	Purpose	1
	Process	2
	Definition of Terms	5
II.	COURSEWARE DESCRIPTION	9
III.	COURSEWARE EVALUATION	15

I. INTRODUCTION

A. PURPOSE

Except in instructional situations where student programming is the primary activity, microcomputers can be used to assist the instructional process effectively only to the extent that quality software is available.

This Evaluator's Guide has been developed to provide background information and forms to aide teachers and other educators in evaluating educational software and courseware. Two forms, "Courseware Description" and "Courseware Evaluation", are described. The design of the evaluation form is based on the assumption that most of the information on the description form is available.

The forms were based originally on the forms developed and used by the CONDUIT Project for evaluating computer-based instruction packages for post-secondary institutions, with additional concepts adopted from forms developed by other organizations and individuals.

The Guide was originally designed to be used by school personnel who are participating in the courseware evaluation process of MicroSIFT, described in the next section. In addition, however it has been found useful by individual teachers or others who wish to evaluate courseware before purchasing, and as a supplement to preservice and inservice courses concerned with the development or use of computer based applications.

B. PROCESS

In December 1979, under a contract with the National Institute of Education, the Computer Technology Program of the Northwest Regional Educational Laboratory began designing a clearinghouse for microcomputer-based educational software and courseware. The clearinghouse, called MicroSIFT (Microcomputer Software and Information For Teachers), has as one of its goals the development and implementation of an evaluation process and related instruments for such courseware.

The design of MicroSIFT includes a selected network of significant centers of instructional computing activities at the K-12 level. The centers are large school districts or regional consortia where full time instructional computing staff exist, and which have a history of development, evaluation and implementation of instructional applications of computers. This Network forms the basis for the evaluation process.

The four stages of the evaluation process are described on the following pages.

B. PROCESS
(Continued)

1. Phase I, Sifting

Sifting, Phase I of this process, is the first look at a package which screens out those programs that are not instructional in nature. In addition to a program's instructional value, the sifting phase determines a package's "operational readiness" and its "hardware compatibility" status. The MicroSIFT staff are responsible for this stage.

2. Phase II, Description

Assuming the software fails to meet the MicroSIFT standards for the sifting phase, the evaluation terminates. However, if the software qualifies as "instructional", "operational" and "compatible" it then enters Phase II, "Courseware Description." Phase II briefly describes the package specifying the program format, instructional purpose and technique(s), type of package, available documentation and the hardware configuration necessary for operation. MicroSIFT staff complete most of this stage, using the "Courseware Description" form described in Part II of this Guide.

B. PROCESS
(Continued)

3. Phase III, Evaluation	Teachers with experience in the subject and grade level of the material are selected from schools served by the network site to evaluate courseware according to the content, instructional quality and technical quality criteria identified in the "Courseware Evaluation" form described in Part III of this Guide. An evaluation is also done by an expert in instructional computing employed at the network center. These reviews are summarized and published quarterly by MicroSIFT.
4. Phase IV, In-Depth Evaluation	Some materials because of complexity or amount of curriculum covered, warrant more extensive evaluation. Activities in this category would be pre- and post-testing or observation of student activity at the computer. Instruments to support this phase are not included in this Guide.

C. DEFINITION OF TERMS

In the fields of microcomputers and education, terminology can easily be misinterpreted. So that everyone using this Guide will interpret words in the same way, a brief glossary is provided below. Each definition conforms to some standard use of the term but is not necessarily a composite of all uses nor the most common use.

Content	Facts, terms, ideas, concepts, principles, theories and constructs which make up the subject matter of an instructional package.
Courseware	Software and printed materials which support instruction in a complete course of study or a definable subset of a course. In this sense, it is not required that all instructional activities be supported by the package or that the tutorial mode of instruction be employed. Even a 30 minute student activity aimed at one objective can be courseware in this definition.
DOS	Disc Operating System: an operating system which includes the capability of controlling and coordinating the functions of a disc drive within a computer system.
Graphics	Images displayed on a video screen or printer which are generated by a computer program.

C. DEFINITION OF TERMS
(Continued)

Hardware	Equipment, including computers, disk drives, cassette players, cables, monitors.
Materials	Books, folders, envelopes, worksheets and similar items. "User Support Materials" are items which support the activity of a person using a computer program.
Micro	A microcomputer.
Microcomputer	A computer system, including peripheral hardware such as disk drive and monitor, based on a microprocessor (or "chip"), and having a typewriter-like keyboard.
Operating System	A program or set of programs which controls and coordinates the operations of the components of a computer system.
Package	One or more computer programs with related materials and the storage medium. A package represents a microcomputer application.
Program	A computer program, written in BASIC, Pascal, machine code or other computer programming language.

C. DEFINITION OF TERMS
(Continued)

ROM	Read Only Memory: a microelectronic storage medium which contains a program permanently stored there by the manufacturer to perform a specific function. The computer user may only use the program, and cannot store a program on ROM or alter a program stored there.
RAM	Random Access Memory: a microelectronic storage medium which ordinarily constitutes the main working memory of a microcomputer and which is re-usable. That is, the user of the computer may store programs or data in RAM, and in so doing erases information previously stored there.
Software	Computer programs, including application programs, operating systems, and languages.
Storage Medium	Tape cassette, flexible disk, ROM cartridge, or RAM for storing microcomputer programs.

II. COURSEWARE DESCRIPTION

Before a package can be evaluated, you will need some factual information about it. For example, does it have all the components necessary to make it an instructionally useful package? Indeed, determining the existence of needed components is itself an evaluation.

The "Courseware Description" form identifies the information necessary for evaluation and use of a package. In some cases, a list of components is included. In a complete package, all the information should be readily available in the program and support materials.

Completing the form should be a straightforward task. If, however, some information is not provided in the package, you may be able to infer some of it by a trial use of the package.

Some of the sections on the "Courseware Description" form are discussed below.

Version	A version number, a date, or hardware identifier.
Producer	The original source (developer, publisher, author, individual) who produced the package.
Grade/ Ability Level	The grade level, grade range, or other ability level indicator for which the package is intended.

Subject Area	A general area, such as Mathematics, Reading or History.
Specific Topic	A subset of Subject Area, such as multiplication, phonics, or World War I.
Required Hardware	Identify the types of hardware required as a minimum for package use. Some examples are: a. Computer (brand, version) b. RAM amount c. Mass Storage Devices (disk drives, cassettes) d. Output Devices (color or black-and-white monitor or TV, printer) e. Other Peripherals (joystick, paddles, voice synthesizer) f. Special Electronics (circuit cards, interfaces)

Required Software	Identify the language, operating system, and utility software required to install and use the application software in the package. Include any drivers, subroutines or special software requirements not in the package or standard in the hardware specified.
Instructional Objectives	List the purposes, goals or objectives that the package is intended to achieve.
Instructional Prerequisites	Describe the experiences, skills, concepts, understandings, maturity and ability levels which the intended user should possess for successful use of the package.

Describe Package Content and Structure

Abstract of Content

This information should be available in the material provided by the producer of the package. However, you may wish to add comments if the description is incomplete or inaccurate. Some suggested components of the description are discussed below.

General Content

Describe the general content domain of the package.

User's Role

Describe the dimension of user control over rate, sequence, amount, type and content of problem examples, if applicable.

e.g. "The user determines how much time will be allowed for solving each problem."

"The user defines the number of hospitals, the amount of medicine available, and the quantity of pesticides used for mosquito control."

Describe Package Content and Structure
(Continued)

Instructional Strategy — Describe the instructional strategy used in the courseware.

e.g. "This is a drill and practice program designed to increase student proficiency and speed in solving quadradic equations."

"This courseware simulates a malaria control situation by determining cost effectiveness and impact of the variables selected by the user."

Instructional Integration — Describe the degree to which the package is or can be an integral part of instruction. For example, it may be intended as a random or casual supplement, chosen by teacher or student, one of several options. On the other hand, it may be the only way an important topic can be addressed with a student activity.

Program Structure — Describe the flow or sequence of activity in the program.

e.g. "The program contains three major sections, a presentation of an example, a section of controlled user activity, and a section of uncontrolled user exploration."

III. COURSEWARE EVALUATION

The Courseware Evaluation form is designed to be used after the information in the Description form is available. The rating of the 22 items in the centerfold of the form is to be the starting point of the evaluation. The sections of the form are described in the sequence they are to be completed.

Judgments should be based on thorough investigation of the program and support materials in the package. It is intended that where the term "package" is used, all components are to be taken into account in making the evaluation.

Rating — Items 1 through 21 are to be rated on the scale provided. It is anticipated that in some cases a given item may be meaningless for the package being evaluated, and so NA (Not Applicable) should be circled.

NOTE: The descriptions of each of the items on the following pages are intended to be suggestions for consideration in arriving at a judgement on the item. They are not necessarily checklists, are not in order of importance, and are not exhaustive of possible considerations. The alphabetic identifiers are merely for reference purposes.

Importance — All items on the list are considered to be important. However, for a given package, certain items may take on greater or lesser importance than most items in the list. H or L may be circled to indicate a higher or lower value for an item in relation to all the other items. Since this is an indicator of relative value, not all can be identified as H or L. Use of this column may help you to apply this set of criteria to packages which differ from each other in mode of instruction.

Comments — Brief comments concerning the rating of any item may be written in the space to the right of the item.

Student Use

It is not expected that student use of a package be observed in this evaluation process. However, if it is convenient, the evaluation may be more valuable. You as a professional are making a judgment based on your teaching experience in the grade level and subjects intended for the package. If students take part, check the box at the top of the center page.

1. The content is accurate.

Possible problems in content accuracy include:

a. outdated information or instructional approach

b. factual errors

c. invalid model used in a simulation

d. oversimplified model or examples

e. improper use of statistics

f. inaccurate graphs or displays

2. The content has educational value.

Any decision on this item will be highly subjective. Some considerations leading to a positive judgment might include:

a. The content and objectives are addressed in common school curricula.

b. The knowledge and skills involved have utility in some aspect of life.

c. An instructional situation can be envisioned in which the package would be useful

d. Use of the package enables you to learn something about the nature or needs of the student using it.

e. The content of the package is central to the subject field.

3. The content is free of race, ethnic and sex stereotypes.

   a. Certain racial, ethnic or sex groups may be overrepresented at the expense of limiting others in their contextual settings.

   b. Some racial, ethnic or sex groups may be portrayed in terms that are indicative of false generalizations about the characteristics of that group.

4. The purpose of the package is well defined.

Purposes, goals and objectives may be in the program or in user support materials. The identification of instructional objectives is important to the transferability and use of an instructional package.

a. Objectives should be explicit, rather than inferred.

b. Objective statements should be clear; i.e., unambiguous and without multiple meanings, succinct, free of jargon.

c. Objectives should be stated in terms of expected student behaviors.

The package should include both general and specific statements of purpose. That is, the overall purpose of the package ought to be concisely stated, with specific objectives stated for specific components.

5. The package achieves its defined purpose.

Courseware can be evaluated in much the same way that other instruction is evaluated--the starting place being the instructional objectives. Based on these objectives, the student using the instructional package should learn what the material sets out to teach, rather than merely being engaged in the process.

The most effective way to substantiate this aspect of instructional quality is through a sample run of the program, preferably with a learner from the target audience. However, if such a learner is not available, the evaluator should make a judgement as to how well the package would actually accomplish its objectives when used by a student of the appropriate maturity and ability, based on the evaluator's experience with students of that type.

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COURSEWARE DESCRIPTION

Package Title _____

Version _____ Cost _____

Producer _____

Subject Area _____ Grade/Ability Level _____

Specific Topic _____

Dewey Decimal _____

Sears Subject Headings _____

ERIC Descriptors _____

Medium of Transfer: _____ Tape Cassette _____ 5" Flex. Disk

_____ ROM Cartridge _____ 8" Flex. Disk

Required Hardware:

Required Software:

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Type of Package: _____ Single Program _____ Integrated program series component

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Instructional Purpose: (Please check all applicable)

_____ Remediation _____ Standard Instruction _____ Enrichment

---

Instructional Techniques: (Please check all applicable descriptions)

_____ Drill and Practice	_____ Game	_____ Learning Mgmt.
_____ Tutorial	_____ Simulation	_____ Utility
_____ Informational Ret.	_____ Problem Solv.	_____ Other

Documentation Available: (Circle all that are available in the computer program (P) or in the supplementary materials (S)).

P	S	Suggested grade/ability level(s)	P	S	Teacher's information
P	S	Instructional Objectives	P	S	Resource/reference information
P	S	Prerequisite skills or activities	P	S	Student's instructions
P	S	Sample program output	P	S	Student worksheets
P	S	Program operating instructions	P	S	Relationship to standard textbooks
P	S	Pre-test	P	S	Follow-up activities
P	S	Post-test	P	S	Other _____

Is listing and alteration of the computer program allowed?

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COURSEWARE EVALUATION

Package Title _____ Version _____

Reviewer's Name _____ Date _____

25. Describe the potential use of the package in classroom settings.
(NOTE: Complete the centerfold section before completing this item.)

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RATING: Circle the letter abbreviation which best reflects your judgment (use the space following each item for comments).

IMPORTANCE: Circle the letter which reflects your judgment of the relative importance of the item in this evaluation.

☐ Check this box if this evaluation is based partly on your observation of student use of this package.

	RATING: Strongly Agree / Agree / Disagree / Strongly Disagree	Not Applicable	IMPORTANCE (OPT): Higher / Lower		Evaluator's Guide Page Reference →
CONTENT	SA A D SD	NA	H L	1. The content is accurate.	18
	SA A D SD	NA	H L	2. The content has educational value.	19
	SA A D SD	NA	H L	3. The content is free of race, ethnic, sex, and other stereotypes.	20
INSTRUCTIONAL QUALITY	SA A D SD	NA	H L	4. The purpose of the package is well-defined.	21
	SA A D SD	NA	H L	5. The package achieves its defined purpose.	22
	SA A D SD	NA	H L	6. Presentation of content is clear and logical.	23
	SA A D SD	NA	H L	7. The level of difficulty is appropriate for the target audience.	24
	SA A D SD	NA	H L	8. Graphics/color/sound are used for appropriate instructional reasons.	26
	SA A D SD	NA	H L	9. Use of the package is motivational.	27
	SA A D SD	NA	H L	10. The package effectively stimulates student creativity.	28
	SA A D SD	NA	H L	11. Feedback on student responses is effectively employed.	29
	SA A D SD	NA	H L	12. The learner controls the rate and sequence of presentation and review.	30
	SA A D SD	NA	H L	13. Instruction is integrated with previous student experience.	31
	SA A D SD	NA	H L	14. Learning is generalizable to an appropriate range of situations.	32
TECHNICAL QUALITY	SA A D SD	NA	H L	15. The user support materials are comprehensive.	33
	SA A D SD	NA	H L	16. The user support materials are effective.	36
	SA A D SD	NA	H L	17. Information displays are effective.	38
	SA A D SD	NA	H L	18. Intended users can easily and independently operate the program.	40
	SA A D SD	NA	H L	19. Teachers can easily employ the package.	42
	SA A D SD	NA	H L	20. The program appropriately uses relevant computer capabilities.	43
	SA A D SD	NA	H L	21. The program is reliable in normal use.	45

Permission to copy this form for courseware evaluation purposes is hereby granted.

22. CHECK ONLY ONE

____ I would use or recommend use of this package with little or no change. (Note suggestions for effective use on the front page.)

____ I would use or recommend use of this package only if certain changes were made. (Note changes under major weaknesses on the next page.)

____ I would not use or recommend this package. (Note reasons under major weaknesses.)

23. Describe the major strengths of the package:

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24. Describe the major weaknesses:

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Instructional Objectives: Stated ☐ Inferred ☐

Instructional Prerequisites: Stated ☐ Inferred ☐

Describe Package Content and Structure:

Describer's Name _____ Date _____

6. Presentation of content is clear and logical.

The focus of this item is on how the terms, facts, concepts and principles of the subject matter are presented rather than on the content itself.

a. The information is well organized.

b. The structure of the presentation is evident to a user.

c. Definitions and explanations are available when necessary.

d. There is a smooth transition between concepts and cognitive clusters.

e. The progression of presentation is logical and well identified.

f. Examples, counter-examples and illustrations are used where possible.

g. The examples are relevant to the point of instruction.

7. The level of difficulty is appropriate for the target audience.

   a. The means of response (i.e., multiple choice, manipulating graphics, single keystroke, etc.) is appropriate to the target audience.

   b. The readability of support materials and program text is consistent with the expected ability level of the audience. Vocabulary, phrasing and sentence length are specific considerations here.

   c. Examples and graphic illustrations are suitable for the maturity of the student.

   d. The time required for typical student use does not exceed the attention span of the target audience.

   e. Size of steps in logical processes are suited to the ability level of the student.

   f. There are multiple levels of instruction, with diagnostic and reinforcement routines, for individual differences in the target audience.

      e.g. The program automatically branches to remediation subroutines if user responses require.

7. The level of difficulty is appropriate for the target audience.
(Continued)

f. There are multiple levels of instruction, with diagnostic and reinforcement routines, for individual differences in the target audience.
(Continued)

The program automatically progresses to more difficult problems to continually provide a challenge to the user that has mastered the easier problems.

The program automatically provides easier problems to the user who is having trouble.

8. Graphics/sound/color are used for appropriate instructional reasons.

   a. Graphics, sound and color enhance rather than detract from the instructional process.

   b. Use of sound does not disturb others in a classroom environment.

   c. Graphics, sound and color focus attention on important content areas.

   d. Good message design principles are used in order to place emphasis where important concepts are.

   e. Visual and auditory effects stimulate student interest.

9. Use of the package is motivational.

a. Students are effectively addressed in a personal style.

b. Narratives in the program use humor and a conversational manner.

c. The overall tenor of interaction is warm, friendly, helpful.

d. The package provides for a variety of student responses and response modes.

e. A variety of responses to student inputs are used.

f. Reinforcement is positive and dignified.

g. A student is left with a desire to use the package again, or to pursue the topic in other ways.

h. A student is left with a positive attitude about the experience.

i. Using the package is a pleasant experience.

10. The package effectively challenges student creativity.

a. The learner is involved in an active, rather than passive, manner in the instruction.

e.g. The student has control over as many input variables as the program permits.

The computer is used in a "hands-on" way rather than merely in a presentation mode.

The program design allows the student as many decisions as possible.

b. The package provides opportunities to answer open-ended questions that have no "right" or "wrong" answers, and gives the student evaluative criteria to judge his/her own responses.

c. The program is designed to anticipate a wide range of possible responses.

d. The student is provided with new ways of looking at the world.

e. The package demonstrates a creative means of using the knowledge being acquired by the user.

f. The package suggests areas of further exploration or other activity.

g. The student is challenged to change an underlying model or design an alternative model.

11. Feedback on student responses is effectively employed.

a. The feedback is relevant to the students' responses and therefore "credible".

b. The feedback is non-threatening, yet corrective when necessary.

c. The feedback is timely, i.e., given with appropriate frequency and given immediately after a response.

d. The feedback remediates (gives cues, hints and explanations).

e. There is quantitative feedback when valuable.

e.g. The program indicates the number and percentage of problems correct out of the number of problems attempted.

f. The feedback tells "why" the response was incorrect (e.g., "You should have spelled the name correctly." or "Use no punctuation.").

g. The judgement of student responses properly assesses the concept being taught, not merely its form.

e.g. Is word order more important than the content of the response?

h. The program adapts to the learner by adjusting the difficulty level of content.

12. The learner controls the rate and sequence of presentation and review.

    a. Student has control over the time allowed for solving problems, allowing for quickening or slowing the pace as the user deems necessary.

    b. Student has control over the rate of presentation of display material so that he/she can read and absorb the information at his/her own rate.

    c. The program does not lock the student into a linear instructional sequence.

    d. The program allows the student to begin at a point appropriate to his/her past achievements.

    e. The program has a provision for review of instructions initiated by the user.

    f. The program defines "functions" for learner options such as "HELP", "HINT", "DICTIONARY."

13. Instruction is integrated with previous student experiences.

a. Instruction is designed to take into account the background experiences typical of the target audience.

b. Inductive reasoning is employed. Known situations are used to explain new situations.

c. Commonly experienced examples are used.

e.g. Some students may better understand liquid metric measurements within the context of filling the car with gasoline rather than filling a graduated cylinder with water.

d. Instruction moves from the concrete to the abstract, simple to complex, familiar to unfamiliar.

14. Learning is generalizable to an appropriate range of situations.

a. The learning is applicable to a student's future experiences.

e.g. The instruction prepares the user for the next unit in the package.

b. The student is presented with opportunities that require generalization of the rules acquired at the computer and opportunities to apply those rules to "real life" situations away from the computer.

c. The processes and information learned are useful in domains and situations other than the subject area of the package.

d. The content is organized in such a way as to facilitate recall and application away from the computer and outside of the immediate content domain.

e.g. Is the metric system taught within the context of the decimal system, or as isolated measurements (meter, gram, liter, etc.).

15. User support materials are comprehensive.

In this item, you are assessing the completeness of the package, in terms of its support for the teachers and students in the intended pattern of use, and reasonable optional uses. Many different types of information may be included in the printed material accompanying the program. The components of good user support materials identified here can be packaged in many ways. Separate identification does not imply a need for separate booklets, although that may be desirable. (See also item 16.)

a. Student materials: sufficient materials for a variety of student activities should be provided.

-- pre-instruction activities relating to the package

-- a guide to use of the package

-- follow-up activities to reinforce the instruction

-- worksheets

b. Teacher's Information

-- a description of the instructional activities to take place

15. User support materials are comprehensive.
(Continued)

b. Teacher's Information
(Continued)

-- suggestions for classroom logistics in a variety of hardware situations (single or multiple machines, hardware not in classroom, etc.)

-- a rationale for computer use

-- prerequisite skills necessary for best utilization

-- teacher directed pre and post instructional activities

c. Resource Information

-- bibliography of resources and references related to the content domain

-- sample run of the program

-- possibilities for program modifications

-- a description of the model used in simulations

15. User support materials are comprehensive.
(Continued)

d. Technical Documentation

-- detailed explanation of how the program and package operates

-- program code listings

-- explanation of user definable options to adapt the program for different applications.

-- explanation of the software/hardware interface or any other extraordinary features of the program

-- flowchart or other diagrams of general logic of individual programs and package

-- interpretation of error messages

e. Containers

-- folders, binders, pockets for storing printed materials, disks, cassettes or other components

-- boxes or other container for organizing and storing the entire package

16. The user support materials are effective.

a. The appearance of the materials is attractive.

b. The quality of the paper or binding is appropriate to its intended use and expected life.

c. The printed text is clear, readable and attractive.

d. Pictures, diagrams and graphs are appropriate and readable.

e. The text, captions, labels, etc. are thoroughly edited, and free of errors in grammar, spelling and punctuation.

f. The packaging of the materials is suitable for the intended use.

e.g. student worksheet masters indented for reproduction are "loose leaf" or easily reproduced.

teacher support materials can be separated from student materials.

g. The program storage media are easily accessible, yet protected from random injury expected in mailing, dropping, etc.

h. The entire package is storable as a unit in standard storage facilities (office shelves, cabinets, etc.)

16. The user support materials are effective.
(Continued)

i. Materials are easily used in table space typically available near a microcomputer station.

17. Information displays are effective.

Good message design principles are incorporated into the visual arrangement of display material.

a. Graphic displays are not too complex or full of too much information.

There is adequate spacing on the screen or printed materials for clarity.

Static and dynamic graphics are used when applicable.

Screen and printed displays make effective use of open space.

b. Text narrative on the monitor or printer is clear and easy to read.

c. Narrative is not ambiguous.

d. Text information is not too lengthy or "wordy."

e. The user is given adequate time to read and absorb the information given in the displays.

f. Text is free from spelling and punctuation errors.

g. Character sets employed are appropriate for the intended audience.

17. Information displays are effective.
(Continued)

h. Graphics are not too repetitive or too slow in presentation.

i. Input options are independent of color, or at least avoid common color blindness problems.

j. There is not too much text for the display.

The text position is consistent and/or predictable (i.e., the student does not have to hunt for the information).

k. Graphics are appropriately mixed with text material to give variety to the presentation.

l. Transitions from display to display on a video screen are smooth and unobtrusive.

m. Scrolling is used appropriately. Only pertinent information is retained on the screen.

n. Adequate teacher/student options for use or nonuse of sound are provided.

o. Graphics are not distracting to the user.

18. Intended users can easily and independently operate the program.

a. The program has enough internal documentation to permit ease of use even without external paper documentation.

b. Formats and protocols for user-computer communication are consistently applied and logical.

c. Directions are accompanied by useful examples where appropriate.

d. Help pages and functions are provided and accessible at likely points of need.

e. The program does not allow the user to get lost in the program with no apparent way out. The student always has some options for getting the program running again, or returning to a beginning point.

f. The program doesn't stop or appear to be doing nothing without clues.

g. Traps are used copiously to catch potential errors of any kind, and to avoid moving control from the application to the operating system software.

h. Instructions and error messages are clear and unambiguous. They give the user clear directions as to what he/she must do to effectively use the program.

18. Intended users can easily and independently operate the program.
(Continued)

i. The program responds to inputs as the directions indicate.

j. The user can easily exit the program, return to menus, or move to another section with program-described conventions.

k. The program accurately evaluates student input; i.e., it does not misinterpret student responses and thereby identify a response as incorrect when it is in fact correct.

l. Computer operation does not interfere with concentration on the activity.

m. The program can be used with a minimum of computer competencies.

n. The user isn't uneasy using the sofware due to its complexity of operation.

o. The user is informed of which function keys he/she will use in the course of the program and their purpose.

p. There is the necessary cueing for function key usage.

q. Those function keys referred to in the program are available on the hardware.

r. The use of function keys does not necessitate re-input of user responses previously input into the computer.

19. Teachers can easily employ the package.

Not only should the program be easily used by the students, but it should be equally employable by the teachers. Many of the same considerations as in item 19 can be applied here, but also:

a. The program can be used by a person having a minimum of computer competencies.

b. The program requires a minimal amount of equipment manipulation by the teacher.

c. Software modifications or unusual manipulations of disks are not required to effectively use the program.

d. The package is easily adaptable to a variety of classroom learning environments, including placement of hardware inside or outside the classroom.

e. Error handling and identification are sufficiently detailed so the teacher can easily help a student.

f. Students require a minimum amount of teacher supervision while using the program.

20. The program appropriately uses relevant computer capabilities.

The success of the computer as a means for instruction is due to those capabilities inherent in the technology. Computer software should take full advantage of the unique aspects of the computer rather than merely doing the same activities in a new way.

a. The application is well suited to computer use and not one that can be handled more appropriately by other means.

b. Course management or computer collection and organization of data on instruction is available.

e.g. The information about the student's performance is stored for retrieval at a later time.

c. The computer is used in a dynamic, interactive way.

e.g. The computer makes decisions based on student performance according to the teaching strategies inherent to the program.

d. The computer makes effective use of other peripheral devices (e.g., printers, light pens, paddle controllers, joysticks, etc.) for alternate input modes.

20. The program appropriately uses relevant computer capabilities.
(Continued)

e. The computer is used to simulate activities that are too difficult, dangerous or expensive to demonstrate in reality.

f. The computer is used so that students are actively involved in a "hands-on" manner rather than only passively observing.

g. The computer responds to natural student input such as "YES" or "NO" or their first letter rather than "1 = YES, 2 = NO."

21. The program is reliable in normal use.

a. The program will consistently run under all normal conditions. No special precautions such as clearing memory are required for effective program execution.

b. The program will consistently load into the computer without undue complexity, such as re-loading.

c. The program is free of programming and operational errors ("bug-free").

22. Evaluator Recommendation.

Having concluded a review of the instructional objectives, prerequisite activities, content and structure, and rating the various considerations of content, instruction and technical quality, you are then ready to make a recommendation as to the use of the package.

You have three options from which to choose to represent your estimation of the program's usability. These options correspond to section 23 of the Evaluation Form. Elaborations can be made in sections 24 through 26, which ask for ways the program can be used effectively and identification of major strengths and weaknesses in the program.

a.	Recommend Program	I would use or recommend use of this program/package with little or no change. (Note suggestions for effective use, next page.)
b.	Recommend With Changes	I would use or recommend use of this program/package only if certain changes were made. (Note changes under major weaknesses, next page.)
c.	Do Not Recommend	I would not use this program/package. (Note reasons under major weaknesses.)

23. Describe the major strengths of the package.

24. Describe the major weaknesses of the package.

In completing these items the evaluator should refer to Content, Instructional and Technical Quality ratings 1 through 22. These ratings, along with any notes or comments that the evaluator made, should serve as the basis for specifying the program's strengths and weaknesses. Following are some example comments.

Content Strengths

- "The laboratory simulation was accurate and could be used in place of the real laboratory situation."
- "The instructional objectives are stated and are very specific as to terminal performance behavior."

Content Weaknesses

- "Some equations were graphed incorrectly on the monitor."
- "The recommended audience age is too young for program content."

Instructional Strengths

- "The user has control over many of the variables affecting his/her instruction."
- "The simulation adequately considers all of the variables related to the problem."

23. Describe the major strengths of the package.
(Continued)

24. Describe the major weaknesses of the package.
(Continued)

Instructional Weaknesses

- "The program does not allow students to generate their own answers--only make a choice of four options."
- "The student only watches the program. There is no active participation in the courseware."

Technical Strengths

- "The directions were very clearly stated, giving examples when necessary."
- "The documentation is thorough and comprehensive."

Technical Weaknesses

- "The computer was used as nothing more than an electronic textbook. None of the unique interactive characteristics were used."
- "The documentation included only a listing of the program. No objectives or prerequisites were mentioned."

25. Describe the potential use of the package in classroom settings.

The list of items 1-22 in the centerfold of the evaluation form should be completed before this item. A recommendation for use with or without changes should be accompanied with a description in this space of the possible use you envision for the package in specific classroom settings. The description might include:

a. The different audience characteristics to whom the program is applicable.

e.g. The package should be used with individuals and small groups only

Program could also be used with audiences older than the recommended target audience.

b. The different teaching modes the program may enhance.

e.g. The package can be used to introduce the topic.

The courseware can be used to reinforce related instruction and to test the adequacy of that instruction.

c. Any "unique" applications the courseware may have.

e.g. The package could be used in a "contest" form to see which team can devise the best strategy for solving the problem.